

Should the US and Russia destroy their stocks of smallpox virus?

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YES The World Health Organization is justly proud of the global effort that led to the eradication of smallpox; but the job remains unfinished. Although it is almost 30 years since the last natural transmission of smallpox virus (*Variola*),¹ laboratories in the United States and Russia retain virus stocks.

The destruction of remaining *Variola* stocks is an overdue step forward for global public health and security that will reduce the possibility that this scourge will kill again, by accident or design. Although deploying modern scientific techniques such as genetic engineering on smallpox virus may be intellectually intriguing, the risks far outweigh the benefits.

In 1990, the US secretary of health and human services, Louis Sullivan, made a pledge on behalf of the US government. "There is no scientific reason not to destroy the remaining stocks of wild virus," he declared, "So I am pleased to announce today that after we complete our sequencing of the smallpox genome, the United States will destroy all remaining virus stocks."² Although the genome was published in 1994,³ the US still hasn't honoured its commitment.

WHO member states concur that the virus stocks must be destroyed. For more than a decade, the US and Russia have paid lip service to the WHO consensus while trying to outmanoeuvre actual destruction of the virus. In 1999 Russia and the US balked at the World Health Assembly resolution calling on them to destroy the virus (resolution 49.10). Since then, both countries have accelerated smallpox research. Risky experiments are underway to create a monkey model of human smallpox infection.⁴ The US has also proposed genetic engineering experiments with the virus.⁵

WHO's experts have agreed that no valid reason exists to retain smallpox virus stocks for DNA sequencing, diagnostic tests, or vaccine development.⁶ In 2006, WHO's experts concluded: "Sufficient sequence information on the virus was now available; no further research requiring access to live variola virus was considered

essential." They also determined that "the number of detection and diagnostic systems for variola virus now available was adequate."⁶ Antivirals are not absolutely required because existing vaccines are effective and diagnostic tests are rapid and accurate. And WHO experts have recently suggested that drugs against smallpox could be developed without the dangerous US experiments with live smallpox virus intended to create an animal model of human infection. WHO advisers suggest that this could be accomplished through the far safer route of using monkeypox virus.⁷

Questionable threat

The US has recently made much of the possibility of smallpox in the hands of terrorists or "rogue states." Illicit stocks have been used to justify retention of US and Russian smallpox virus stocks. There is a fallacy here because smallpox virus stocks are not necessary to respond to a smallpox outbreak. If smallpox reappeared, the virus would be readily available if needed for biomedical purposes.

The claims about illicit stocks have not been supported by evidence. The loudest allegations were against Iraq, but the US belatedly admitted that it was wrong. There is no credible evidence that any terrorist organisation has smallpox virus. To acquire the virus terrorists would have to breach security at one of WHO's repositories. Producing quantities of weaponised smallpox is beyond the means of any known terrorist group.

Increasing danger

The US National Science Advisory Board on Biosecurity is discussing a proposal to weaken domestic legislation to permit US laboratories to synthesise and possess larger sequences of smallpox DNA.⁸ This will make its DNA easier to acquire and increase the range of dangerous experiments possible outside the official WHO virus repositories.

In 2005, the head of the WHO eradication effort, Donald Henderson, told the *Independent*: "The less we do with the smallpox virus and the less we do in the way of manipulation at this point I think the better off we are."⁹ Yet one unfortunate consequence of the US insistence that its smallpox virus is critical to its national

security is that other countries may become convinced that they too must possess the virus and research into it. The smallpox strains in the WHO repositories in the US and Russia were deposited by various countries and were isolated all over the world. It is unclear who legally owns the collections.

The decades old eradication job of WHO will be completed, and the world will be safer, when the US and Russian smallpox virus stocks are finally destroyed. Recently, Africa has taken the lead at the World Health Assembly. Its health ministers see all too clearly what could happen if smallpox were to escape. Africa's efforts, with support from other developing regions, have put WHO member states into a position to do more than recall unfulfilled pledges when the World Health Assembly convenes in May 2007.

As memory of the horror of smallpox recedes and biotechnology advances, it is important to draw a firm line around *Variola*. Instead of courting disaster, we should seek to ensure that possession of this virus is treated as a crime against humanity. The key prerequisite to criminalising *Variola* is to destroy the existing stocks. It has been three decades coming, but it is time for WHO to push the button on the autoclave. Better late than too late.

Competing interests: The Sunshine Project campaigns against the hostile use of biotechnology.



Child suffering from smallpox

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